Docket No.: 1454.1610

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of:

Elena COSTA et al.

Serial No. 10/532,346 Group Art Unit: 2617

Confirmation No. 3925

Filed: April 22, 2005 Examiner: Jaime Michele Holliday

For: METHOD FOR RADIO SYSTEM RESOURCE MANAGEMENT

APPEAL BRIEF

Mail Stop Appeal Brief-Patents
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is in response to the Office Action mailed August 26, 2010, in the above-identified application, and pursuant to the Notice of Appeal filed November 26, 2010. The due date for the filing of the Appeal Brief is March 22, 2011 which is one month after the mailing date, February 22, 2011, of the Notice of Panel Decision from Pre-Appeal Brief Review.

I. Real Party in Interest

The inventors Elena COSTA, Harald HAAS, Matthias LOTT and Egon SCHULZ on March 18, 23, 21 and 18, 2005, respectively, executed an Assignment, assigning all rights in the subject application to SIEMENS AKTIENGESELLSCHAFT of Munich, Germany. Therefore, the real party in interest is SIEMENS AKTIENGESELLSCHAFT.

II. Related Appeals and Interferences

There are no related appeals or interferences known to Appellants, Appellants' legal representatives or the Assignee, SIEMENS AKTIENGESELLSCHAFT, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims

Claims 1-14 are cancelled and claims 15-29 are pending and stand rejected under 35 U.S.C. §103(a). The rejections of claims 15-29 are appealed.

IV. Status of Amendments

No amendment was entered after the Office Action of August 26, 2010. A Pre-Appeal Brief Conference Request was filed with the Notice of Appeal on November 26, 2010. The Notice of Panel Decision from Pre-Appeal Brief Review mailed February 22, 2011 indicated that the appeal should proceed.

V. Summary of Claimed Subject Matter

A radio communication system, as illustrated in FIG. 1 of the application, includes subscriber stations (e.g. mobile station MS_n), base stations (e.g. nodes BS_1-BS_3) and other network devices. Generally, a mobile station is connected to one base station as long as the mobile station is located inside a radio cell (illustrated as a hexagonal shape in FIG. 1 of the application), which surrounds the base station. The frequency band available for the electromagnetic communication in the radio communication system is usually divided into sub-carriers. Management of time slots and/or frequency sub-carriers in the radio communication system is critical to achieving a reduction of interference of signals emitted from different base stations at the mobile station and for efficient handovers (i.e., passage of the mobile station from one base station to another).

Claim 15

Independent claim 15 is directed to a "method for managing radio resources of a frequency band having sub-carriers in a cellular radio communications system configured as a multi-carrier system" (claim 15, lines 1-3) as described, for example, in paragraphs [0028] to [0031] of the Substitute Specification and illustrated in FIGs. 1 and 2 of the application, "comprising: temporarily during a first time period allocating the sub-carriers to the radio cells, to make the sub-carriers available during the first time period to each radio cell for transmission of information" (claim 15, lines 3-6) as described, for example, in paragraph [0013].

Claim 15 also recites "allocating the sub-carriers to the radio cells during a second time period, the sub-carriers being allocated by assigning each of the sub-carriers only to a subset of the radio cells including at least two radio cells for transmission of the information" (last 3 lines) as described, for example, in paragraphs [0014] and [0016].

Claim 27

Independent claim 27 is directed to a "radio communication system of cellular construction configured as a multi-carrier system using at least one frequency band having sub-carriers for transmission of information" (claim 27, lines 1-2) as described in paragraph [0028] with reference to FIG. 1). The radio communication system recited in claim 27 includes "at least two radio cells" (claim 27, line 4) which, for the embodiment described on pages 7-10 of the Substitute Specification, are represented by the hexagonal shapes around BS_1, BS_2 and BS_3 in FIG. 1. The radio communication system recited in claim 27 also includes "at least one control device assigning the sub-carriers of the at least one frequency band to said at least two radio cells" (claim 27, lines 5-6) as described, for example, in paragraph [0029] with reference to SE in FIG. 1. The control device "make[s] all of the sub-carriers temporarily available to each radio cell for transmission of information" (claim 27, lines 6-7), "during a first time period" (claim 27, line 6), and then "during a second time period, temporarily each of the sub-carriers is available to a subset of the at least two radio cells for transmission of information" (claim 27, last 3 lines) as described, for example, in paragraphs [0030], [0033]-[0035] and [0037].

Claim 28

Independent claim 28 is directed to a "control device of a radio communication system of cellular construction, that is configured as a multi-carrier system having at least two radio cells with at least one frequency band having sub-carriers for transmission of information in the at least two radio cells" (claim 28, lines 1-3) as described, for example, in paragraph [0029] with reference to SE in FIG. 1.

The control device comprises "means for temporarily assigning the sub-carriers of the at least one frequency band to the at least two radio cells during a first time period so that the sub-carriers are temporarily available to each radio cell for the transmission of the information" (claims 28, lines 5-7) and

> means for temporarily assigning the sub-carriers of the at least one frequency band among the at least two radio cells during a second time period so that each of the sub-carriers is temporarily available to a subset of the at least two radio cells for the transmission of the information

(claims 28, last 4 lines). One of ordinary skill in the art of cellular telephone systems would understand from the description provided in the specification that the functions recited in claim 28 as being performed by both of the "means for temporarily assigning" may be performed by properly programming processor(s) in a control device for a group of base stations.

VI. Grounds of Rejection to be Reviewed on Appeal

In the August 26, 2010 Office Action, claims 15, 16, 18-20, 27 and 28 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 6,052,593 to Guimont et al. in view of U.S. Patent No. 6,990,348 to Benveniste. Claim 17 was rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Guimont et al. and Benveniste and further in view of U.S. Patent No. 6,917,580 B2 to Wang et al. Claims 21 and 22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Guimont et al. and Benveniste and further in view of U.S. Patent Publication No. 2002/0147017 to Li et al. Claim 23 was rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the combination of Guimont et al., Benveniste and Li et al. and further in view of U.S. Patent No. 5,726,978 to Frodigh et al. Claims 24 and 25 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the combination of Guimont et al., Benveniste and Frodigh et al. and further in view of U.S. Patent Publication No. 2002/0082016 A1 to Obayashi. Claims 26 and 29 were rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Guimont et al. and Benveniste and further in view of U.S. Patent Publication No. 2004/001429 A1 to Ma et al. At issue is whether the combination of Guimont et al. and Benveniste with one or more of Wang et al., Li et al., Frodigh et al., Obayashi and Ma et al. suggests all of the limitations recited in claims 15-29.

VII. Argument

The Prior Art

Guimont et al.

Guimont et al. describes a method for assigning frequencies to transceivers in cells of a cellular telephone system supporting analog and/or digital communications channels (see col. 1, lines 10-13). A frequency assignment proposal is evaluated to determine whether it is compatible with a current cell configuration, by insuring that sufficient frequencies are available for assignment to meet the traffic and control channel requirements and availability of the included cell transceivers (see Abstract). Approved proposals result in a revision of the frequency plan assignment. Based on records of past approved proposals, it is determined whether a current proposal if implemented would have an adverse effect on the network.

FIG. 1 of Guimont et al. illustrates the cells 10 being grouped in clusters of cells 12. Each cluster 12 uses all the available frequencies (subsets A to G) while any single cell 10 of a cluster uses only a subset (e.g., subset A) of the available frequencies (see col. 4, lines 7-40). Thus,

within the cluster the base station do not interfere because they use different frequencies. This model does not foresee handover of mobile station moving from one cell to a neighboring one.

Although in Guimont et al. the allocation of the frequencies may be changed, such a change occurs only when an alternative allocation is judged to be beneficial. However, the allocation can be maintained indefinitely. A change of the allocation of the frequencies is not a known predetermined event occurring after or at known moments. Thus, no allocation of the frequencies is temporary, to be changed after a first time period, according to a predetermined sequence of allocation schedules.

Benveniste

Benveniste is directed to a self-configuring wireless system which derives re-use criteria and neighbor lists to enable the assignment of channels to cells. As illustrated in Fig. 2 of Benveniste the "improved channel re-use criteria" (block 2700) is based on "signal-to-interference ratios and/or signal attenuation" (block 2600) and thus, "[s]electively re-assign[ing] channels" (block 2800) will only occur if signal-to-interference ratios and/or signal attenuation indicates that an improvement can be made.

Ma et al.

Ma et al. describes a wireless terminal for communicating over a shared Orthogonal Frequency Division Modulation (OFDM) band. Ma is directed to uplink communication of multiple user with one base station (e.g., paragraph [0110] in the context set forth in [0002] and [0003]). The wireless terminal has a first transmit chain for generating and transmitting a low rate mode OFDM transmission in a first frequency band of the OFDM band, and a second transmit chain for generating and transmitting a burst-mode transmission in a second frequency band of the OFDM band, the first frequency band being distinct from the second frequency band.

Figure 2 of Ma et al. illustrates the usage of OFDM frequencies 1-32. Each circle represents a single sub-carrier during a single transmission (see [0122]). Mode 1 sub-carriers are used for low rate circuit oriented connectivity, while Mode 2 sub-carriers used for higher rate bursting connectivity. At certain times, e.g. between t_{i+10} and t_{i+11}, all the carriers may be used for Mode 1. Paragraph [0219] states:

> In some embodiments, the RACH is also used for initial timing and synchronization. After randomly selecting one of the RACH signatures, an accessing UE transmits using the whole available access band--this preferably includes all Mode-1 sub-carriers.

However, this refers to a user equipment (mobile phone), not all cells. That is all subcarriers are available relative to the same single base station receiving the data from multiple users (i.e. terminals). Given the typical fixed position of the base station, Ma et al. merely discusses usage of the frequency band for communication within a cell as defined in the context of the invention.

Claims 15, 16 and 18-20

In item 2 on pages 4-9 of the August 26, 2010 Office Action, claims 15, 16, 18-20, 27 and 28 were rejected under 35 U.S.C. § 103(a) as unpatentable over Guimont et al. in view of Benveniste. In rejecting the claims, it was asserted that "allocating the sub-carriers to the radio cells, to make the sub-carriers available during a first time period to each radio cells (sic) for transmission of information" (August 26, 2010 Office Action, page 4, lines 9-10) and "allocating the sub-carriers to the radio cells, the sub-carriers being allocated by assigning each of the sub-carriers only to a subset of the radio cells including at least two radio cells for transmission of the information" (August 26, 2010 Office Action, page 4, lines 11-13) were disclosed in the Abstract, Fig. 1 and column 4, lines 19-40 of Guimont et al. Furthermore, it was asserted the only limitation recited in claim 15 not taught by Guimont et al. was "that the sub-carriers are allocated during different time periods" (August 26, 2010 Office Action, page 4, lines 19-20).

However, the quotations above from lines 9-13 on page 4 of the August 26, 2010 Office Action do not contain all of the limitations recited in claim 15 and the missing limitations amount to more than merely "that the sub-carriers are allocated during different time periods" as stated in the August 26, 2010 Office Action. Claim 15, requires that the allocating of "the sub-carriers to the radio cells, to make the sub-carriers available during a first time period to each radio cell" is performed "**temporarily** during ... [the] first time period" (claim 15, line 4, emphasis added) prior to "allocating the sub-carriers to the radio cells during a second time period, the sub-carriers being allocated by assigning each of the sub-carriers only to a subset of the radio cells" (claim 15, lines 7-8). An example of the first time period provided in paragraph [0035] of the Substitute Specification is "a first OFDM frame."

As discussed above, Fig. 1 of Guimont et al. illustrates the cells 10 being grouped in clusters of cells 12. Each cluster 12 uses all the available frequencies (subsets A to G) while any single cell 10 of a cluster uses only a subset (e.g. subset A) of the available frequencies (see, column 4, lines 7-40). Thus, within the cluster the base stations do not interfere because they use different frequencies. Although in Guimont et al. the allocation of the frequencies may be changed, such a change occurs only when an alternative allocation is judged to be beneficial. Otherwise, the allocation may be maintained indefinitely. A change of the allocation of the

frequencies is not an event occurring after or at predetermined times. Thus, no allocation of the frequencies is ensured of being performed "**temporarily** during a first time period" as required on line 4 of claim 15.

The August 26, 2010 Office Action attempted to overcome the deficiencies of Guimont et al. by citing Fig. 2 and column 6, lines 5-10 of Benveniste as disclosing

> temporarily during a first time period allocating the sub-carriers to the radio cells (during initialization phase {*first time period*}, each cell is assigned a control channel and at least one traffic channel [fig. 2, col. 6 lines 5-10]) and allocating the sub-carriers to the radio cells during a second time period (... selectively reassigning channels to the base station based on said improved re-use criteria [fig. 2, col. 10 ...lines 9-34]).

(August 26, 2010 Office Action, page 4, last line to page 5, line 7). It was asserted that it would be obvious to combine these teachings in Benveniste with those in Guimont et al. "to selectively reassign channels to a call after initial allocation ... to efficiently create or revise a frequency plan" (August 26, 2010 Office Action, page 5, lines 9-11).

It is submitted that Benveniste does not clearly support the assertions of the Examiner. There are statements qualifying the reassignment, e.g., "[i]f there are enough RF frequencies available to provide the necessary channels without the need for re-use, the derivation of re-use criteria can be by-passed" (column 6, lines 9-12) and "[t]he initialization phase can be by-passed when expanding a wireless system if there exist sufficient RF frequencies to assign as control channels to the newly added base stations without ... interference to, or ... from, existing base stations" (column 6, lines 13-18). Furthermore, as noted above, Fig. 2 of Benveniste clearly shows that the "improved channel re-use criteria" (block 2700) is based on "signal-to-interference ratios and/or signal attenuation" (block 2600) and thus, "[s]electively re-assign[ing] channels" (block 2800) will only occur if signal-to-interference ratios and/or signal attenuation indicates that an improvement can be made. Thus, like Guimont et al., Benveniste does not disclose a specified period during which allocation of the sub-carriers to the radio cells is temporary, as required by claim 15.

The August 26, 2010 Office Action asserted that the arguments in the preceding paragraphs contained "just a general statement that summarizes the limitation not taught, which is then clearly taught by the secondary reference" (August 26, 2010 Office Action, page 2, lines 11-12). It is submitted that this is merely a restatement of the Examiner's opinion and does not rebut the arguments made above by showing why they are incorrect or by citation to where the prior art discloses something that contradicts what is cited in the preceding paragraphs.

Therefore, it is submitted that claim 15 patentably distinguishes over Guimont et al. in view of Benveniste for the above reasons.

Furthermore, nothing has been found in Guimont et al. and Benveniste suggesting that the revised assignment of channels meets the limitation of "assigning each of the sub-carriers only to a subset of the radio cells **including at least two radio cells**" (claim 15, last 2 lines, emphasis added). No mention has been found in either reference **requiring** that each subset have at least two radio cells. The Response to Arguments section of the August 26, 2010 Office Action responded to this argument by noting that Guimont et al. teaches

> available frequencies in the cellular frequency band ... are divided in accordance with the frequency plan (allocated) into ***frequency groups*** 14 (***sub-carriers***), with the ***frequency groups*** assigned amongst the ***cells*** 10 of each ***cluster*** 12 (***sub-set of cells*** ... {*see items* ***12*** *and* ***14****; the E subset is assigned to two cells*})"

(August 26, 2010 Office Action, page 2, line 20 to page 3, line 2, emphasis in original) citing the Abstract, Fig. 1 and column 4, lines 19-40 of Guimont et al.

It is unclear why the Examiner believes that the statement at page 2, line 20 to page 3, line 2 of the August 26, 2010 Office Action rebuts the argument in the preceding paragraph. Applicants acknowledge that Fig. 1 of Guimont et al. illustrates two full clusters of seven cells, e.g., 10(1) through 10(7), where the same subset of frequencies, e.g., sub-frequency groups B(1) through B(n), are assigned to one cell in each cluster, so that there are seven sub-frequency groups, A through G, in each of the two fully labeled clusters illustrated in Fig. 1 However, Fig. 1 of Guimont et al. merely illustrates that one sub-carrier has been (or multiple sub-carriers have been) assigned to multiple cells and this is insufficient to meet the limitation recited on the last three lines of claim 15. To make that limitation obvious, the prior art must teach or suggest that there is **always** an assignment of each sub-carrier to more than one cell. Thus, it is submitted that claim 15 patentably distinguishes over Guimont et al. and Benveniste for this additional reason.

Claims 16 and 18-20 depend from claim 15 and therefore, it is submitted that claims 16 and 18-20 patentably distinguish over Guimont et al. and Benveniste for at least the reasons discussed above with respect to claim 15.

Claim 27

Claim 27 recites

> assigning the sub-carriers of the at least one frequency band to said at least two radio cells during a first time period to make all of the sub-carriers temporarily available to each radio cell for transmission of information, and ... during a

second time period temporarily each of the sub-carriers is available to a subset of the at least two radio cells

As discussed above with respect to claim 15, Guimont et al. and Benveniste together do not disclose a specified period during which allocation of the sub-carriers to the radio cells is temporary, as required by claim 27. Furthermore, nothing has been found in Guimont et al. and Benveniste suggesting that the revised assignment of channels meets the limitation of "assigning the sub-carriers of the at least one frequency band to said **at least two radio cells**" (claim 27, lines 5-6, emphasis added). For all of the above reasons, it is submitted that claim 27 patentably distinguishes over Guimont et al. and Benveniste

Claim 28

Claim 28 recites

temporarily assigning the sub-carriers of the at least one frequency band to the at least two radio cells during a first time period so that the sub-carriers are temporarily available to each radio cell for the transmission of the information; and ... temporarily assigning the sub-carriers of the at least one frequency band among the at least two radio cells during a second time period so that each of the sub-carriers is temporarily available to a subset of the at least two radio cells

As discussed above with respect to claim 15, Guimont et al. and Benveniste together do not disclose a specified period during which allocation of the sub-carriers to the radio cells is temporary, as required by claim 28. Furthermore, nothing has been found in Guimont et al. and Benveniste suggesting that the revised assignment of channels meets the limitation of "assigning the sub-carriers of the at least one frequency band among the **at least two radio cells**" (claim 28, lines 8-9, emphasis added). For all of the above reasons, it is submitted that claim 28 patentably distinguishes over Guimont et al. and Benveniste

Claims 17, 21-26 and 29

In item 3 on page 10 of the August 26, 2010 Office Action, claim 17 was rejected as unpatentable over Guimont et al. and Benveniste and further in view of Wang et al. In item 4 on pages 10-12 of the August 26, 2010 Office Action, claims 21 and 22 were rejected as unpatentable over Guimont et al. and Benveniste and further in view of Li et al. In item 5 on page 12 of the August 26, 2010 Office Action, claim 23 was rejected as unpatentable over Guimont et al., Benveniste and Li et al. and further in view of Frodigh et al. In item 6 on pages 13-14 of the August 26, 2010 Office Action, claims 24 and 25 were rejected as unpatentable over Guimont et al., Benveniste and Frodigh et al. and further in view of Obayashi. In item 7 on pages 14-15 of the August 26, 2010 Office Action, claims 26 and 29 were rejected as unpatentable over Guimont et al. and Benveniste and further in view of Ma et al. (although "claim 25," not "claim

29," appears on line 1 of page 15, this is apparently a typographical error, since the limitations of claim 29, not claim 25 were discussed).

Claim 17 depends from claim 15 via claim 16; claims 21, 22, 26 and 29 depend from claim 15; and claims 23-25 depend from claim 15 via claims 21 and 22. Nothing has been cited or found in Wang et al., Li et al., Frodigh et al., Obayashi or Ma et al. suggesting modification of Guimont et al. and Benveniste to overcome the deficiencies discussed above with respect to claim 15. Therefore, it is submitted that claims 17, 21-26 and 29 patentably distinguish over Guimont et al., Benveniste, Wang et al., Li et al., Frodigh et al., Obayashi or Ma et al. for at least the reasons discussed above with respect to claim 15.

Summary of Arguments

For the above reasons, it is submitted that claims 15-29 patentably distinguish over Guimont et al., Benveniste, Ma et al., Wang et al., Li et al., Frodigh et al. and Obayashi.

Please apply the previously paid appeal fee set forth in 37 C.F.R.§ 41.20(b) and charge any additional fees for submission of this Appeal Brief to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: 3/22/11

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VIII. Claims Appendix

15. A method for managing radio resources of a frequency band having sub-carriers in a cellular radio communications system configured as a multi-carrier system, comprising:

temporarily during a first time period allocating the sub-carriers to the radio cells, to make the sub-carriers available during the first time period to each radio cell for transmission of information; and

allocating the sub-carriers to the radio cells during a second time period, the sub-carriers being allocated by assigning each of the sub-carriers only to a subset of the radio cells including at least two radio cells for transmission of the information.

16. A method in accordance with claim 15, wherein said allocating of the sub-carriers during the second time period makes at least one of the sub-carriers available to exactly one radio cell in the at least two radio cells.

17. A method in accordance with claim 16, wherein said allocating of the sub-carriers during the second time period makes each of the sub-carriers available to exactly one radio cell in the at least two radio cells.

18. A method in accordance with claim 15, wherein the at least two radio cells are adjacent radio cells.

19. A method in accordance with claim 15, wherein said allocating of the sub-carriers during the second time period allocates the sub-carriers to n radio cells, making assigned sub-carriers available to at least one radio cell have a frequency spacing of n sub-carriers.

20. A method in accordance with claim 15, wherein said allocating of the sub-carriers during the second time period makes at least some adjacent sub-carriers in the frequency band available to at least one radio cell.

21. A method in accordance with claim 15, wherein said allocating of the sub-carriers during the second time period takes place in accordance with an algorithm that includes use of a code.

22. A method in accordance with claim 21, wherein said allocating of the sub-carriers during the second time period makes the sub-carriers used by base stations of particular radio cells available for transmission of broadcast information.

23. A method in accordance with claim 22, wherein the broadcast information is used to decide on handovers.

24. A method in accordance with claim 23, further comprising determining amplitudes of the broadcast information in subscriber stations receiving the broadcast information.

25. A method in accordance with claim 24, further comprising determining a metric of the amplitudes of the broadcast information transmitted from one of the base stations on the sub-carriers available to the one of the base stations.

26. A method in accordance with claim 15, wherein the cellular radio communications system is an orthogonal frequency division multiplexing system.

27. A radio communication system of cellular construction configured as a multi-carrier system using at least one frequency band having sub-carriers for transmission of information, comprising:

at least two radio cells; and

at least one control device assigning the sub-carriers of the at least one frequency band to said at least two radio cells during a first time period to make all of the sub-carriers temporarily available to each radio cell for transmission of information, and that during a second time period temporarily each of the sub-carriers is available to a subset of the at least two radio cells for transmission of information.

28. A control device of a radio communication system of cellular construction, that is configured as a multi-carrier system having at least two radio cells with at least one frequency band having sub-carriers for transmission of information in the at least two radio cells, comprising:

means for temporarily assigning the sub-carriers of the at least one frequency band to the at least two radio cells during a first time period so that the sub-carriers are temporarily available to each radio cell for the transmission of the information; and

means for temporarily assigning the sub-carriers of the at least one frequency band among the at least two radio cells during a second time period so that each of the sub-carriers is temporarily available to a subset of the at least two radio cells for the transmission of the information.

29. A method in accordance with claim 26, wherein the first time period is a predetermined number of one or more orthogonal frequency division multiplexing frames.

IX. Evidence Appendix

(None)

X. Related Proceedings Appendix

(None)